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Xylaria in southern China – 8. *X. bannaensis* sp. nov. and *X. brunneovinosa* new to the mainland

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Abstract—Two *Xylaria* species associated with termite nests in China are reported. *Xylaria bannaensis* is described as a species new to science, and *X. brunneovinosa* is reported for the first time from Mainland China. The morphological descriptions and photographs of stromata and microstructures are provided based on Chinese materials.

Key words—*Ascomycota*, *Xylariaceae*, *Xylariales*

Introduction

Many *Xylaria* species are frequently found emerging from termite nests, a long acknowledged association (Petch 1906). Many mycologists have been interested in the relationships between fungi and termites (Petch 1913, Lloyd 1918a,b, 1924, Dennis 1956, 1958, 1961, Boedijn 1959, Sands 1969, Heim 1977, Batra & Batra 1979, Rogers et al. 1987, Wood & Thomas 1989, Whalley 1996, Ju & Rogers 1999, Rogers et al. 2005, Ju & Hsieh 2008). *Xylaria* species are considered to function as either saprotrophs, inhabiting the comb material and competing with species of the agaric *Termitomyces* R. Heim for nutrients (Sands 1969, Heim 1977, Wood & Thomas 1989), or symbionts, making the comb material suitable for growth of both fungus and termite (Batra & Batra 1979). The diversity of termitophilous *Xylaria* species in China is still poorly known (Tai 1979, Abe & Liu 1995), and further investigations are highly desirable.

Materials & methods

Examined specimens are deposited in Herbarium of Mycology of Jilin Agricultural University (HMJAU). Microscopic features and measurements were made from slide

preparations mounted in water and Melzer's iodine reagent. The photographs of asci, ascal apical rings, and ascospores were taken by using a VHX-600E microscope (Keyence Corporation). The photographs of stromatal surface were taken with a ZSA30w microscope and S70 Canon camera.

Taxonomy

Xylaria bannaensis H.X. Ma, Lar.N. Vassilyeva & Yu Li, **sp. nov.** Fig. 1

MycoBank MB803942

Differs from *Xylaria arenicola* by its stromatal surface, cylindrical stromata and larger apical ring; and from *X. nigripes* by its larger ascospores.

Type: China, Yunnan Province: Mengla County, Xishuangbanna Tropical Botanical Garden, 21°43′N 101°26′E, alt. 500 m, on ground, 10 Aug 2010, Haixia Ma (**Holotype**, HMJAU 23549).

Etymology: Refers to the place where the fungus was collected.

Stromata unbranched, cylindrical, with rounded fertile apices, on long glabrous longitudinally wrinkled and deeply rooted stipes, 7–10 cm total length × 2.5–5 mm diam., externally dark brown to black, internally at first probably white, and eventually entirely black; texture very hard; surface wrinkled, somewhat cracked, roughened with perithecial mounds. Perithecia ovoid, 0.4–0.6 mm diam.; ostioles papillate. Asci eight-spored, cylindrical, long-stipitate, 60–90(–95) µm total length × 4–5.5 µm, the spore-bearing part 40–45 µm long, with apical ring bluing in Melzer's iodine reagent, minute, 1–1.3 µm high × 1–1.6 µm broad. Ascospores brown to dark brown, unicellular, ellipsoid-inequilateral, smooth, (5.5–)6–7(–7.5) × 3–4 µm, with straight germ slit more or less spore-length.

Comments —*Xylaria bannaensis* resembles *X. arenicola* Welw. & Curr., according to the key of Ju & Hsieh (2008), but their stromatal surfaces are distinctly different. *Xylaria arenicola* has a rougher surface with protuberant perithecia, unlike the somewhat cracked and wrinkled surface of *X. bannaensis.* Compared to the distinctly cylindrical *X. bannaensis* stroma, that of *X. arenicola* is more flattened. Finally *X. arenicola* has a slightly smaller apical ring (both height and width are <1 µm; Rogers et al. 2005).

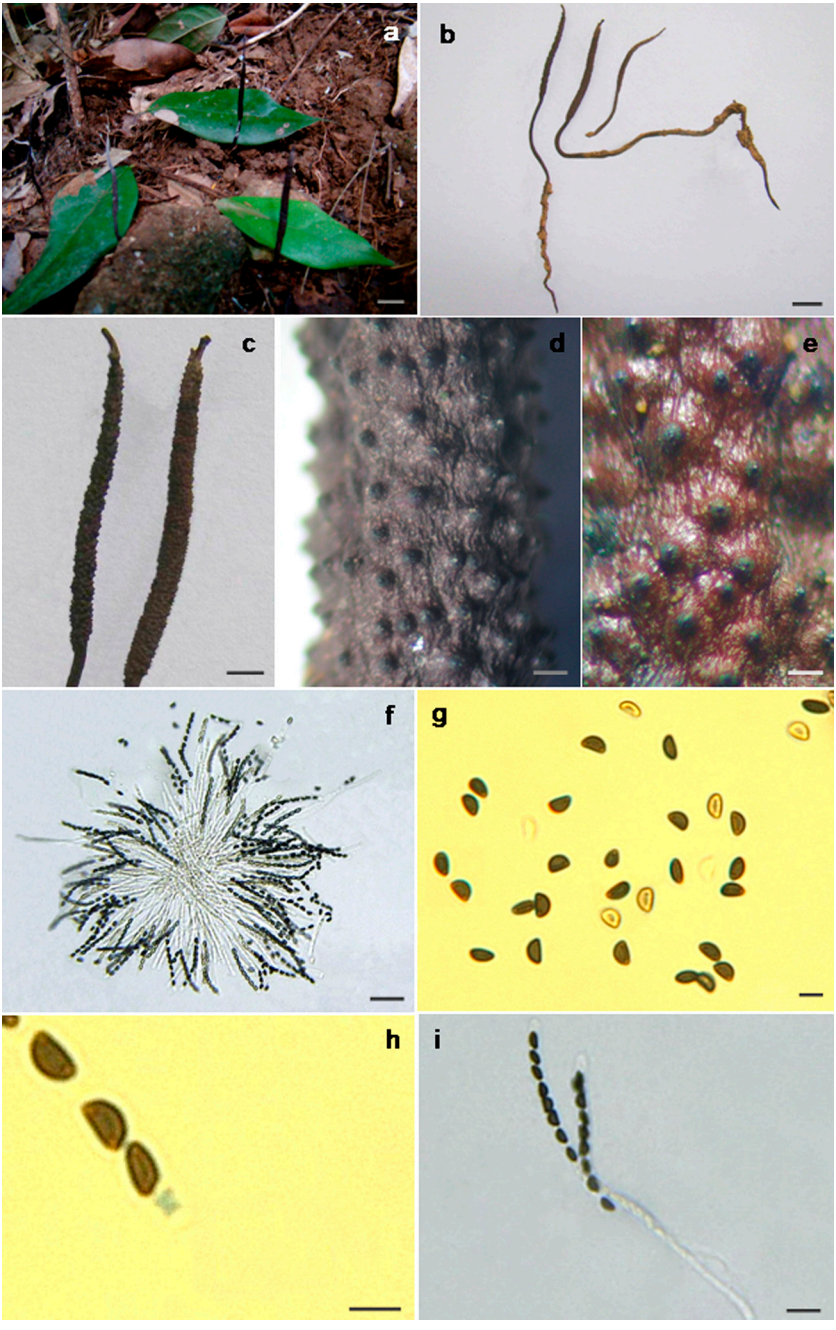
Xylaria arenicola was listed as a synonym (Dennis 1958) or a variety (Dennis 1961) of *X. nigripes* (Klotzsch) Cooke. *Xylaria bannaensis* resembles *X. nigripes* in stromatal morphology, but *X. nigripes* has smaller ascospores ((3.5–)4.5–5 (–6) × 2–3 µm; Rogers et al. 2005).

Xylaria brunneovinosa Y.M. Ju & H.M. Hsieh, Mycologia 99(6): 941. 2008 ["2007"] Fig. 2

Stromata unbranched or sparsely branched from the base, long cylindrical to cylindric-clavate, sometimes flattened, with long sterile and acutely tapered

Fig. 1. *Xylaria bannaensis* (Holotype): a. Stromata; b. Fertile stromatal heads; c. Stromatal surface; d. Ascospores; e. Asci; f. Ascal apical ring (violet). Scale bars: a, b = 1 cm; c = 0.5 mm; d, e, f = 5 μm.

apices, on short or long, glabrous rooting black stipes, 3.5–7 cm total length × 1–5(–7) mm broad, the fertile parts gray brown or brown vinaceous, stipes black, interior at first white to cream, becoming ochraceous; texture very hard; surface smooth except for conspicuous perithecial contours. Perithecia globose, 0.3–0.4 mm diam., ostioles papillate. Asci eight-spored, cylindrical, long-stipitate, (80–)90–130(–140) μm total length × 4.5–5.5 μm broad, the spore-bearing part 43–55 μm long, with apical ring bluing in Melzer's iodine reagent, rectangular, 2–3 μm high × 1–2 μm broad. Ascospores brown to dark


a
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brown, unicellular, ellipsoid-inequilateral, smooth, (5.8–)6–7(–7.5) × 4–5 μm, with straight germ slit slightly less than spore-length.

Specimens examined: **China**, **Yunnan Province**: Mengla County, Xishuangbanna Tropical Botanical Garden, 21°42′N 101°25′E, alt. 500 m, on ground, 10 Aug 2010, Haixia Ma (HMJAU 23577, 23578, 23579).

Comments — *Xylaria brunneovinosa* is easily recognizable by its narrow cylindrical stromata and its stromatal exterior and interior colors. This species, previously reported only from Indonesia and Taiwan, is reported for the first time for Mainland China. The Chinese specimens are quite similar to *X. piperiformis* Berk. and *X. cirrata* Pat. in stromatal morphology and ascospore size, but *X. brunneovinosa* can be easily separated by its brown vinaceous exterior and ochraceous interior. The ascospores of *X. cirrata* are usually minutely pinched at the ends (Ju & Hsieh 2008). *Xylaria piperiformis,* described from Indian material (Rogers et al. 2005), has a smaller apical ring (cuboid, 1.5 μm), the shorter asci (44 μm total length × 4.4 μm broad), and shorter spore-bearing part of asci (ca. 36 μm).

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Fig. 2. *Xylaria brunneovinosa* (HMJAU 23578): a, b. Stromata; c. Fertile parts of stromata; d, e. Stromatal surface; f, i. Asci; g. Ascospores; h. Ascal apical ring (violet). Scale bars: a, b = 1 cm; c = 5 mm; d = 0.5 mm; e = 0.2 mm; f = 30 μm; g, h = 5 μm; i = 10 μm.

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